

# **DRAGSTER DESIGN I & II (METRIC/500- CO<sub>2</sub>)**

**OVERVIEW:** TSA participant in the Dragster Design event are required to design, draw, and build a CO<sub>2</sub> powered vehicle. Design, speed, quality of work and a drawing of the vehicle are the elements evaluated. This is a National Event.

**I. CONTEST PURPOSE**

The purpose of the Dragster Design event is to provide a means for TSA members to demonstrate their ability to design and produce a fast CO<sub>2</sub> powered dragster according to the stated specifications and using only stated materials.

**II. ELIGIBILITY FOR ENTRY**

- A. Must be current TSA state and national member and registered State Conference participant.
- B. This is an individual event. Maximum of eight (8) participants per level, per chapter.

**III. LIMITATIONS**

- A. Entries must be started and completed during the current year.
- B. The dragster and drawing are submitted at the time and place stated in the conference program.
- C. Drawings and cars must be picked up at the specified time upon the conclusion of the event.

**IV. PROCEDURES**

- A. Participants check in their entries at the time and place stated in the conference program.
- B. Entries are reviewed by evaluators and determine, among other things, safety on the track.
- C. Safe dragsters race for qualifying time on the same lane of the raceway.
- D. The top sixteen (16) qualifying cars, based on time trials, are evaluated against the criteria for this event.
- E. Dragsters not meeting event regulations are disqualified, and lower qualifying cars are moved up, until sixteen (16) dragsters meeting specifications are selected.
- F. The top sixteen (16) cars race in a double-elimination format to earn points for the race portion of the event.
- G. Drawing and design points are combined with race points to determine the final standings.

**V. SPECIFIC REGULATIONS**

- A. National rules may differ from state rules. Individuals planning on participating in national competition must adhere to national rules.
- B. Each entry must be submitted with a full-size metric drawing of the completed vehicle. A two (2)-view (top and side) drawing with dimensions is made on paper no larger than B-size drawing paper. Drawings are developed using standard engineering practices and procedures. The drawing may be produced using traditional drafting methods or CAD. The title block includes only the participant's "entry number", which is assigned at registration time and placed on the entry car and drawing during check in.
- C. The official distance between the start line and the finish line on the race track is twenty (20) meters.
- D. Dragsters that do not meet the following specifications/ tolerances will be disqualified from the race:

**Dragster Body**

DB1: One piece, all wood construction. Any type of lamination will result in disqualification.

DB2: No add-ons, such as body strengtheners, fenders, plastic canopy, exhausts, or air foils may be attached to or enclosed within the vehicle. Fiberglass or shrink wrap are considered body strengtheners, and cannot be used on car body for any reason.

DB3: Two or more like or unlike pieces of wood, glued together, are not considered to be one piece, all wood construction.

DB4: Wood choices that could be used: balsa, bass, pine, other.

	<u>Minimum</u>	<u>Maximum</u>
DB5: Body length	200 mm	305mm
DB6: Body height with wheels		75 mm
DB7: Body mass (completed car without CO <sub>2</sub> )	50g	
DB8: Body width at axles, front and back	35mm	42mm
DB9: Vehicle total width (including wheels)		90mm

### **Axles/ axle holes/ wheelbase**

A1: Dragster must have two (2) axles per car, no more.

A2: Bottom of axle bearing, above bottom of car

A3: Rear axle hole from rear of car

A4: Wheelbase (axle distance apart at farthest point)

A5: Bearing, bushings and lubricants may be used.

A6: Glue may be used to secure bearings to body.

### **Spacer washers/ clips**

	<u>Minimum</u>	<u>Maximum</u>
S1: Spacer washers		8
S2: Axle clips		8
S3: Silicone or any other type of glue/ adhesive may not be used in place of wheel clips to hold wheels or axles in place.		

### **Power plant (CO<sub>2</sub> cartridge hole)**

P1: The power plant hole must be at the farthest point at the rear of the car, and must be drilled parallel to the racing surface to assure proper puncture of the CO<sub>2</sub> cartridge. See diagram last two (2) pages. For safety purposes, a minimum of 3mm thickness around the entire power plant hole must be maintained on the dragster.

	<u>Minimum</u>	<u>Maximum</u>
P2: Hole depth	50mm	52mm
P3: Safety zone thickness	3mm	
P4: Chamber diameter	19mm	20mm
P5: Lowest point of chamber diameter to race surface with wheels.	26mm	40mm

### **Eye screws**

ES1: Dragster must have only two screw eyes, per car, that meet tolerances.

ES2: Screw eyes must not make contact with the race surface.

ES3: The track string must pass through both screw eyelets, which are located on the center line on the bottom of the car.

ES4: Glue may be used to reinforce the screw eyes.

ES5: It is the responsibility of the car designer/ engineer to see that the eye screw holes are tightly closed to prevent the track string from slipping out. As with all adjustments, this must be done prior to the event check in. Any screw eye that does not meet this requirement will be disqualified prior to the time trials and will not be raced.

	<u>Minimum</u>	<u>Maximum</u>
ES6: Inside diameter	3mm	5mm

ES7: Distance apart (at farthest points) 150mm 270mm

### **Wheels**

W1: A dragster must have only four (4) wheels. Two (2) wheels must meet rules W3 and W4. The other two (2) wheels must meet rules W5 and W6. All wheels must touch the racing surface at the same time. All wheels must roll. Wheels must be made entirely from plastic. Dimensions must be consistent for the full circumference of the wheel.

W2: Note to car designer/ engineer and club advisor(s). There are two different types of wheels that can be used for this event. External wheels that run on the outside of the car body design and internal wheels which are designed to run on the inside of the car body design. If the car designer/ engineer wishes to use internal wheels on the outside of his/ her car then a fastening device (e-clip, axle retainers, push nuts) must be used on all four (4) wheels two, (2) axles even though they are a press-on fit wheels. No glue or silicone should be used as a fastening device for internal wheel on any body design (traditional dragster, shell car).

	<u>Minimum</u>	<u>Maximum</u>
W3: Front diameter	32mm	37mm
W4: Front width (at surface contact point)	2mm	5mm
W5: Rear diameter	30mm	40mm
W6: Rear width (at surface contact point)	15mm	18mm

E: No repairs or maintenance will be allowed after the entries have been registered. Any entry damaged during the race will be evaluated by the Event Consultant to determine whether or not the vehicle will be allowed to race again. In the event that the vehicle is damaged by Conference personnel, the Event Consultant will rule as to whether the vehicle may be repaired by the student entering the vehicle. This is the only reason a student will be allowed to touch his/ her vehicle after registration. Undamaged wheels that come off during the event may be replaced as determined by the Event Consultant. Damaged wheels may not be replaced.

F: All CO<sub>2</sub> cartridges, needed for the race, will be provided by Idaho TSA.

G: Club advisor(s) should inspect all cars to ensure that there are no rule violations prior to the check in at the State TSA Conference. Your help is greatly appreciated and by doing this you will help speed up the judging portion of this event.

## **VI REQUIRED EVENT PERSONNEL AND EQUIPMENT**

- A. Event Consultant
- B. Event Judges-three four (4) or more per level.
- C. Two (2) persons assigned to check in and receive entries.
- D. Person assigned for security.
- E. Room must be securable for equipment and entries. Size must accommodate a 20-meter track and equipment. Two (2) rooms optional, one per level.
- F. Tables and chairs for Event Judges.
- G. Tables for entries (at least six (6) 2' x 8' tables)
- H. 20-meter track with start gates and timers.
- I. 8 gram CO<sub>2</sub> cartridges- two (2) per entry, plus 100 spares on-site.
- J. Appropriate safety equipment for starting gate and finish line personnel. Safety glasses, gloves, pliers, catching pads for cars, knee pads and first aid kit.
- K. Risers should be provided for audience viewing. Optional

## **VII CRITERIA FOR JUDGING**

A. The criteria for judging are as follows:

1. Design

6 points

2. Drawing

20 points

3. Construction

14 points

4. Speed Trials

60 points

(points allocated 1<sup>st</sup>- 60, 2<sup>nd</sup>- 56, 3<sup>rd</sup>- 52, 4<sup>th</sup>- 48)

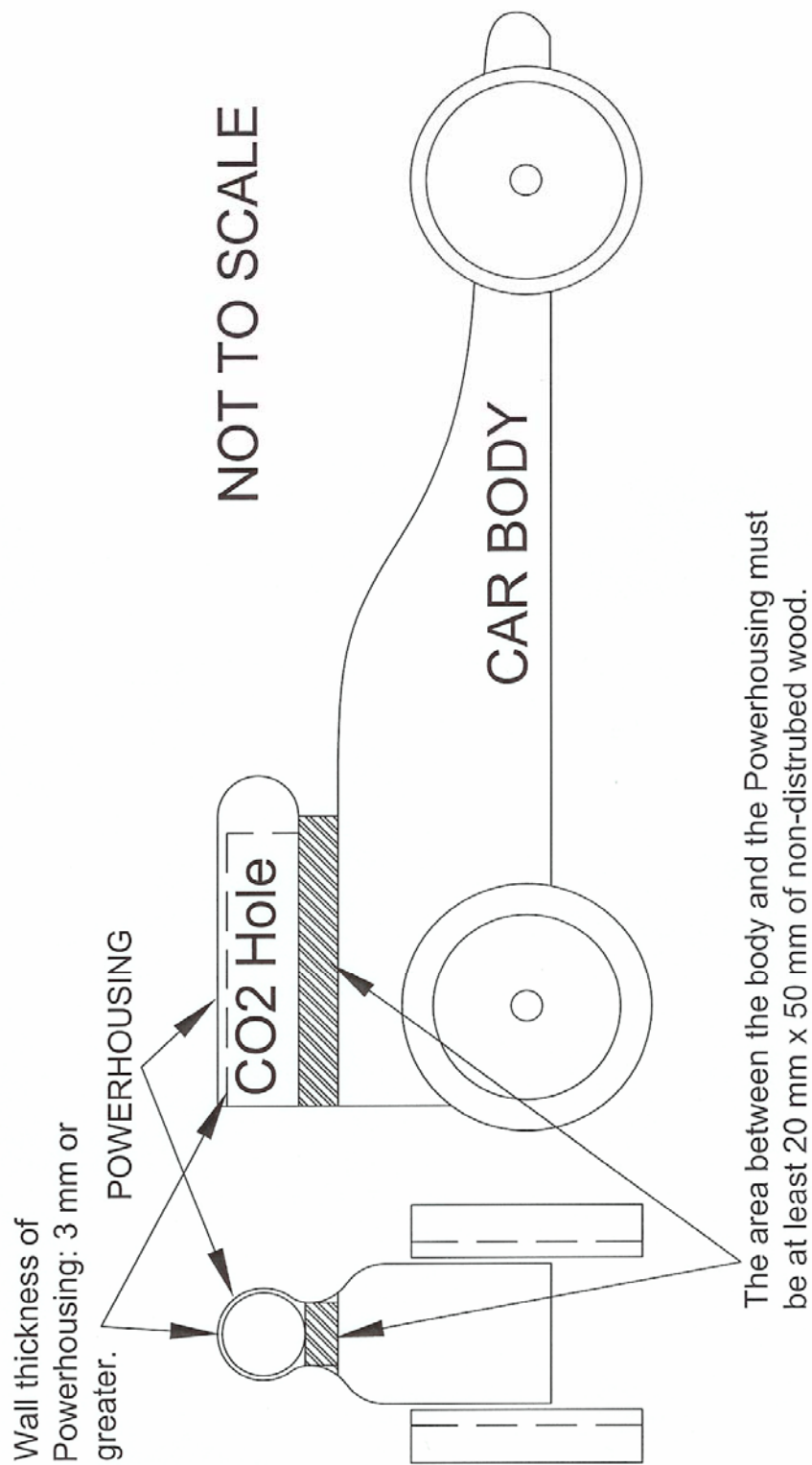
Total

100 points maximum

Rule Violation

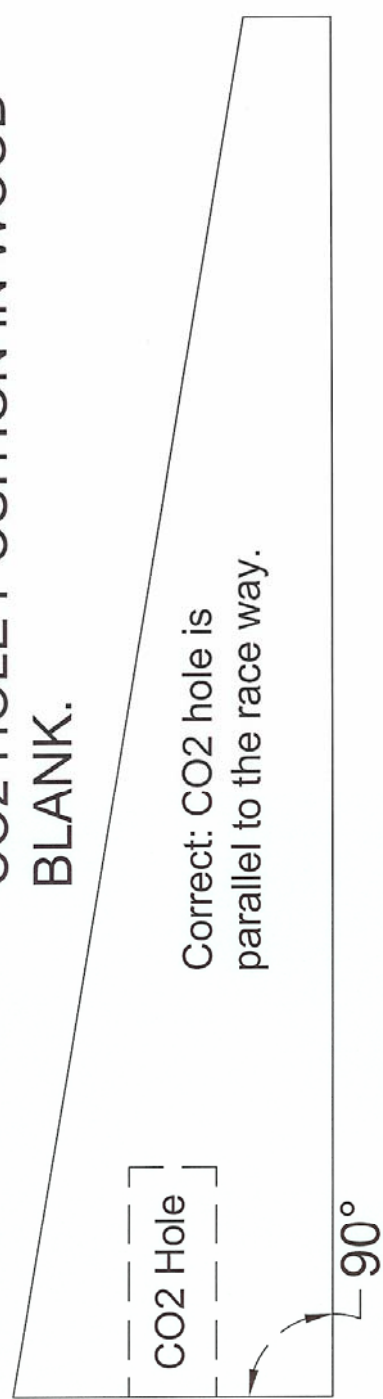
minus 20 points

On cars where the Powerhousing has been carved away from the body.



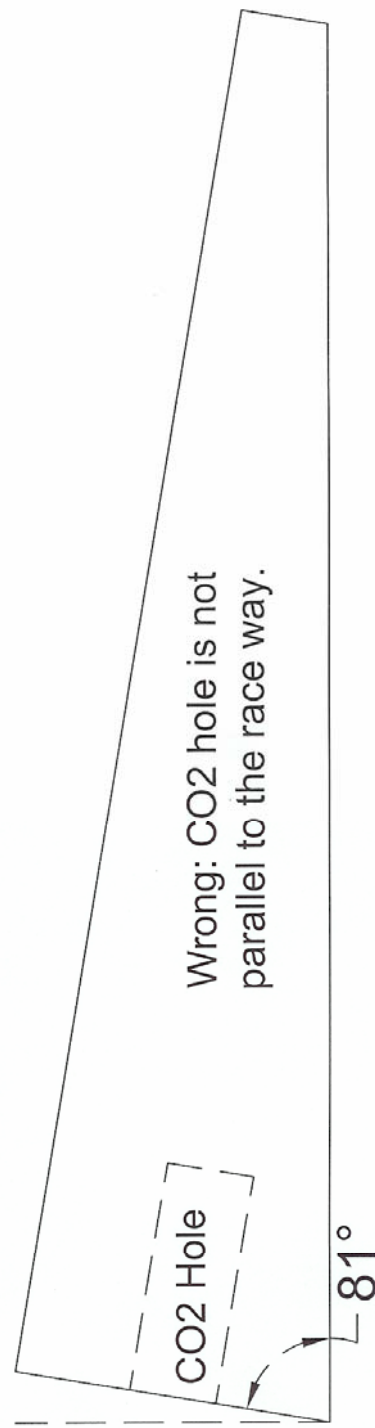
TSA  
NO.

CO2 CAR BODY BLANK SIDE VIEW.  
CO2 HOLE POSITION IN WOOD  
BLANK.



Correct: CO2 hole is  
parallel to the race way.

Race Way



Wrong: CO2 hole is not  
parallel to the race way.

Race Way

NOT TO SCALE

TSA  
NO.